MINERALOGICAL NOTES: No. II.—TOPAZ, BARITE, ANGLESITE, CERUSSITE, AND ZIRCON.

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(Plates xviii.—xx.)

TOPAZ.

Emmaville, New South Wales.

Since a description and figures of topaz crystals from Emmaville was published,[1] Mr. D. A. Porter has presented to the Trustees the specimen represented in Pl. xviii., Fig. 1. It is a typical and finely developed example of the crystalline habit of topaz from this locality, and, as it is somewhat larger than the best crystals hitherto examined, it is possible to represent the faces in approximately their actual relative proportions. As usual there is a comparatively rich prism zone, with the form *m* (110) greatly predominating. Each of the prisms has four faces present, but the pinacoid *b* (010) has only one. The three domes have each the full number of faces. Of the pyramids *o* (221) and *x* (243) have but three faces, while *u* (111) and *i* (223) have four. The faces are with few exceptions smooth and brilliant and give excellent reflections. The crystal measures $9\frac{1}{2}$ mm. × $5\frac{1}{2}$ mm. × 4 mm. The mean co-ordinate angles obtained are as follows :—

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[1] Anderson—Rec. Austr. Mus., v., 1904, pp. 296-299, pl. xxxix., figs. 1-3

Forms.		Measured.				Calculated.				Error.	
		ϕ		ρ		ϕ		ρ		ϕ	ρ
		°	′	°	′	°	′	°	′	′	′
c	001	—	—	—	—	—	—	—	—	—	—
b	010	0	15	90	5	0	0	90	0	15	5
m	110	62	4	90	2	62	8	90	0	4	2
M	230	51	34	90	1	51	35	90	0	1	1
l	120	43	24	90	3	43	25	90	0	1	3
π	250	37	8	90	0	37	7	90	0	1	0
g	130	32	16	90	0	32	14	90	0	2	0
d	201	89	59	60	59	90	0	61	0	1	1
f	021	0	1	43	37	0	0	43	39	1	2
y	041	0	0	62	19	0	0	62	20	0	1
o	221	62	8	63	52	62	8	63	54	0	2
u	111	62	8	45	36	62	8	45	35	0	1
i	223	62	6	34	15	62	8	34	14	2	1
x	243	43	27	41	14	43	25	41	12	2	2

In this as in succeeding tables the calculated angles are those given by Goldschmidt in his Krystallographische Winkeltabellen.

Since a considerable number of angular measurements of topaz crystals from Emmaville are now available, it may be of interest to calculate the corresponding axial ratios, especially as Penfield and Minor[2] have shown that the ratios vary with the isomorphous replacement of fluorine by hydroxyl. For this purpose the angles were carefully revised, the best measurements selected, and means taken. The forms chosen from measurements on six crystals and the mean angles obtained are given in the table below; as it was judged that the prism *m* and the pyramid *u* yield the most reliable data, the corresponding values for *a* and *c* are counted twice in finding the mean ratios.

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[2] Penfield and Minor—Amer. Journ. Sci., xlvii., 1894, p. 387.

Form.		φ			ρ			a	c
		°	′	″	°	′	″		
m	110	62	7	38·5				·5288615	
l	120	43	25	5				·5284015	
g	130	32	14	24				·5285428	
u	111	62	7	38	45	34	40	·5288646	·4769763
f	021				43	39			·4770300
y	041				62	19	30		·4767101
Mean				...			...	0·5287328	0·4769232

The calculated values of *a* and *c* agree fairly closely with Koksharov's ratios $a : b : c = 0·528542 : 1 : 0·476976$, determined on Russian topaz and usually taken as the standard.

Pl. xix., fig. 1 is a stereographic projection showing the distribution of all faces that have been identified on Emmaville topaz.

Oban, New South Wales.

Mr. D. A. Porter recently presented to the Trustees a fine large crystal of topaz from Oban. It measures 4 cm. × 4 cm. × 3 cm., and shows four forms not recognised on crystals from this locality hitherto examined, namely *c* (001), *d* (201), *h* (203), and *X* (043). It is shown in its natural development in Pl. xviii., fig. 2. The specimen is somewhat worn and the faces non-reflecting, but approximate measurements obtained with the contact goniometer leave no doubt as to the correctness of the determinations. There is but one face of *X* present, but all the others have the full number. One of the *f* (021) faces shows a distinct natural etching-figure. It takes the form of a raised semicircular area with its convexity directed towards the apex of the crystal, the base of the semicircle being parallel to the intersection of *f* and *c*.

Mount Cameron, Tasmania.

Through the kindness of Mr. W. F. Petterd, a well-known authority on the minerals of Tasmania, I have been enabled to measure some fine specimens of crystallised Tasmanian minerals, including topaz from Mt. Cameron, Flinders Island, and Bell Mount.

At Mt. Cameron topaz is abundant in the stanniferous drift, but has not been found *in situ.* It is usually much worn, but some crystals well suited for crystallographic determination were sent to me by Mr. Petterd. Two crystals were determined on the goniometer, one a crystal measuring 12 mm. × 13 mm. × 12 mm. and of a greenish colour shown in Pl. xviii., fig. 3. It is fairly rich in prism faces, having *m* (110), *M* (230), *l* (120), and *g* (130) present; *l* predominates, but all are well marked faces and give fairly good images. The terminal faces are rather dull; only one face of *o* (221) is present. The co-ordinate angles obtained are given below.

Forms.		Measured.				Calculated.				Error.	
		φ		ρ		φ		ρ		φ	ρ
		°	'	°	'	°	'	°	'	'	° '
c	001	—	—	—	—	—	—	—	—	—	—
m	110	62	5	89	56	62	8	90	0	3	4
M	230	51	28	89	53	51	34	90	0	6	7
l	120	43	17	89	55	43	25	90	0	8	5
g	130	32	19	89	55	32	14	90	0	5	5
f	021		6	43	35	0	0	43	39	6	4
y	041		8	62	13	0	0	62	20	8	7
o	221	61	57	62	53	62	8	63	54	11	1 1
u	111	62	7	45	29	62	8	45	35	1	6
i	223	62	7	34	13	62	8	34	14	1	1

From another lot of small clear, colourless, crystals one was selected and its faces determined (Pl. xviii., fig. 4). It measures 7 mm. × 5 mm. × 5 mm., and in general habit resembles the last, but has fewer prism faces and has the rather rare pyramid *x* (243) fairly well developed but dull. The prism faces are striated and give only fair signals. Appended are the mean co-ordinate angles found.

Form		Measured.				Calculated.				Error.	
		φ		ρ		φ		ρ		φ	ρ
		°	'	°	'	°	'	°	'	'	'
c	001	—	—	—	—	—	—	—	—	—	—
m	110	61	58	89	58	62	8	90	0	10	2
l	120	43	7	89	58	43	25	90	0	18	2
f	021		1	43	37	0	0	43	39	1	2
y	041		7	62	13	0	0	62	20	7	7
u	111	61	53	45	24	62	8	45	35	15	11
i	223	61	46	33	58	62	8	34	14	22	16
x	243	42	26	41	6	43	25	41	12	59	6

Flinders Island, Tasmania.

Topaz from Flinders Island was first mentioned, I believe, by the late Rev. J. J. Bleasdale, D.D., who wrote: "This may be said of those [*i.e.*, topaz crystals] from Flinders Island that they possess very great fire and beauty when cut, and are nearly all of a pale yellowish shade in the rough."[3] The best account of the occurrence is that of the late C. Gould, Government Geologist of Tasmania, who observed it whilst making a geological reconnaissance of the islands in Bass Strait.[4] The following paragraph gives an abstract of his observations.

It occurs in crystals and pebbles in great variety of form, colour and size, associated with zircon, tourmaline, cassiterite, etc. It is derived from the granite and may occasionally be obtained as fine crystals *in situ* along with crystallised quartz and felspar. It is abundant on the north-east side of Killicrankie Bay in a creek descending from the ranges and upon the beach; it also occurs in other parts of Flinders Island. The topaz has evidently been formed in veins of pegmatite which traverse the granite and vary from one to several feet in diameter. The colour varies from pure limpid to various shades of blue, pale pink, yellow, etc. Crystals are found up to several inches in diameter.

[3] Bleasdale—Trans. Roy. Soc. Vict., vii., 1866, p. 70.
[4] Gould—Proc. Roy. Soc. Tas., 1871 (1872), pp. 60-61.

A fine crystal (Pl. xviii., fig. 5) measuring 7 mm. × 9 mm. × 7 mm., and perfectly clear and colourless was measured on the goniometer. As the faces are very irregularly developed and one side of the crystal is broken, the crystal is drawn in ideal symmetry, but so as to show the habit as nearly as possible. The prisms *m* (110) and *l* (120) are about equal in size and striated, but the images are good. The brachydomes *f* (021) and *y* (041) are relatively small, while the macrodome *d* (201) is unusually large and brilliant. The base is large and smooth. The pyramid *o* (221) is small, *u* (111) and *i* (223) large and brilliant.

The co-ordinate angles found are tabulated below.

Form.		Measured.				Calculated.				Error.	
		φ		ρ		φ		ρ		φ	ρ
		°	′	°	′	°	′	°	′	′	′
c	001	—	—	—	—	—	—	—	—	—	—
m	110	62	8	89	58	62	8	90	0	0	2
l	120	43	23	89	58	43	25	90	0	2	2
f	021		4	43	36	0	0	43	39	4	3
y	041		4	61	59	0	0	62	20	4	21
d	201	90	0	61	5	90	0	61	0	0	5
o	221	62	7	63	43	62	8	63	54	1	11
u	111	62	10	45	33	62	8	45	35	2	2
i	223	62	9	34	11	62	8	34	14	1	3

Bell Mount, Middlesex, Tasmania.

Mr. Petterd informs me that topaz occurs at Bell Mount in a very decomposed quartz-porphyry, also as pebbles weathered out in the drift; it has not previously been recorded from this locality. Two crystals, both colourless and transparent, were examined; one is much worn and broken and unsuitable for goniometric determination. The other (Pl. xviii., fig. 6) has good prism and dome faces but the pyramids are dull and were measured in the position of maximum illumination. The base is absent. The crystal measures 13 mm. × 10 mm. × 11 mm.

Forms.		Measured.				Calculated.				Error.	
		φ		ρ		φ		ρ		φ	ρ
		°	′	°	′	°	′	°	′	′	′
m	110	62	5	89	59	62	8	90	0	3	1
l	120	43	17	89	57	43	25	90	0	8	3
f	021		1	43	36		0	43	39	1	3
u	111	62	2	45	22	62	8	45	35	6	13

BARITE.

Barite has for some time been known to occur at several points in the Triassic area in the neighbourhood of Sydney, both in the Hawkesbury Sandstone and in the succeeding Wianamatta Shales. It was first recorded by Mr. H. G. Smith who found it in a quarry near Cook River, five miles west from Sydney, in small well-formed crystals, consisting of almost pure barium sulphate with a trace of calcium.[5] Subsequently barite was found near Gosford Railway Station.[6] It has also been observed by Prof. T. W. E. David, Trustee, at Five Dock, associated with quartzite and in close proximity to a decomposed basalt dyke. It is found under similar conditions at Pyrmont Sandstone Quarries, and at Pennant Hills Quarries it occurs as veins in the basalt at a depth of over fifty feet. Prof. David believed that the barite found in the Sydney area originated probably from the basalt, numerous dykes of which traverse the sedimentary rocks.[7] He informs me, however, that he has now modified this opinion since observing how widespread is the distribution of barytes in the Permo-Carboniferous sedimentary rocks of the Northern and Southern Coal-fields as well as in the Triassic strata of New South Wales. He now attributes the barite of the Sydney area chiefly to decomposition of detrital barytic felspars. Specimens from Macdonald Town and Thirlmere are in the Australian Museum collection.

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[5] Smith—Proc. Linn. Soc. N. S. Wales, (2), vi., 1892, pp. 131-132.

[6] Baker—*Loc. cit.*, (2), vii., 1893, p. 328.

[7] David—Journ. Roy. Soc. N. S. Wales, xxvii., 1894, p. 407.

The crystals described in this paper are from the Wianamatta Shale at St. Peters, near Sydney. There are three specimens from this locality in the Museum collection, each carrying a number of crystals, but specimens sufficiently good for goniometric determination are found on only one. The crystals are either tabular on the basal pinacoid, or prismatic by extension parallel to the brachy-axis. The combinations are comparatively simple: of two crystals measured one showed the forms *c* (001), *m* (110), *o* (011), *d* (102), the other (Pl. xix., fig. 2) the forms *c* (001), *b* (010), *m* (110), *o* (011), *d* (102), *z* (111). This latter crystal measures approximately 3 mm. × 2½ mm. on the basal pinacoid, and, like all the well formed specimens is quite transparent and colourless. The faces of *b* (010) are very small and were measured in the position of maximum illumination. Only one reliable measurement of the form *z* (111) was obtained. Below are the measured angles.

Forms.		Measured.				Calculated.				Error.	
		φ		ρ		φ		ρ		φ	ρ
		°	′	°	′	°	′	°	′	′	′
c	001	—	—	—	—	—	—	—	—	—	—
b	010		10	90	0	0	0	90	0	10	0
m	110	50	45	89	57	50	49	90	0	4	3
o	011		9	52	38	0	0	52	43	9	5
d	102	90	2	38	45	90	0	38	51	2	6
z	111	50	50	64	7	50	49	64	18	1	11

ANGLESITE.

Maestrie's Mine, Dundas, Tasmania.

Mr. W. F. Petterd says of this occurrence[8] "many of the crystals obtained at this mine are large and beautifully developed, occurring in masses of considerable size, sometimes containing massicot in the interstices and as a base. Commonly large lumps of galena are coated with anglesite, cerussite and massicot, presenting an appearance that has become fairly characteristic of

[8] Petterd—Min. Tasmania, 1893, p. 7.

this mine and the Comet adjoining." In the Museum collection there is one specimen from this locality, consisting of a group of well developed lustrous crystals in a vugh of galena, with powdery limonite. The crystals are of the general habit shown in Pl. xix., fig. 3. The crystal there represented measures 1·2 cm. × 1·9 cm. × 1 cm.; it is slightly broken at one end of the macro-axis, and the *a* (100) faces are strongly striated parallel to their intersection with *m* (110). The predominant forms are *c* (001), *a* (100), and *m* (110); the others are very narrow. Two faces of *d* (102) admitted of measurement, but the pyramids and the dome *o* (011) were determined from single faces. The image obtained from *z* (111) was very poor, the angles being measured in the position of maximum illumination. The measured and calculated angels are given in the following table:—

Form.		Measured.				Calculated.				Error.	
		ϕ		ρ		ϕ		ρ		ϕ	ρ
		°	′	°	′	°	′	°	′	′	′
c	001	—	—	—	—	—	—	—	—	—	—
a	100	89	54	90	0	90	0	90	0	6	0
m	110	51	57	89	57	51	51	90	0	6	3
d	102	90	4	39	17	90	0	39	23	4	6
o	011	0	0	52	16	0	0	52	12	0	4
z	111	—	—	65	0	51	51	64	24	—	36
y	122	32	6	56	45	32	29	56	48	23	3

Mine Meretrice, New Caledonia.

There is one specimen with numerous crystals from this locality in the Museum collection. The anglesite crystals, which are small but beautifully and regularly developed, are embedded in a cavernous gossany matrix; they are transparent and either colourless or slightly yellowish, with a vitreous to greasy lustre. The habit is remarkably uniform, the dominant forms being *c* (001), *m* (110) and *d* (102). Two crystals were measured, one showing only these forms, the other further modified by the forms *b* (010), *o* (011), *z* (111), *y* (122), all with very small faces. (Pl. xix., fig. 4). The co-ordinate angles obtained agreed well with the calculated values.

Lewis Ponds, Near Orange, New South Wales.

This occurrence of anglesite is mentioned in the "Census of New South Wales Minerals" drawn up by a Committee of the Australasian Association for the Advancement of Science in 1890,[9] where the locality is given as the New Lewis Ponds Silver Mine, and it is said to be associated with cerussite and silver ores. On the specimen in the Australian Museum numerous crystals of anglesite are scattered over the surface of a crumbling, limonitous gossan. Many of the crystals are greenish in colour, and are said to contain copper. I was unable to prove the presence or absence of copper definitely on the quantity of material I felt justified in sacrificing, but it may be present in small amount. Anglesite with a green or blue tinge is commonly observed, and this may perhaps be due to an isomorphous mixture of anglesite with a small quantity of the anhrydrous copper sulphate hydrocyanite, which crystallises in the orthorhombic system with axes and angles not far from those of the barite-anglesite group.

The Lewis Ponds crystals show two somewhat different habits; in one the predominant forms are *c* (001), *m* (110), and *d* (102), and the crystals are elongated along the macro-axis (Pl. xix., fig. 5); in the other, by increase in the size of *z* (111), *m* is reduced to a narrow plane, and the crystal is almost acutely terminated on the *a* and *b* axes (Pl. xix., fig. 6). The crystals of the second habit are much smaller than the others, the two shown in Pl. xix., figs. 5 and 6 measuring respectively 5 mm. × 8 mm. × 5 mm., and 3 mm. in diameter. Only the larger crystals are greenish, the smaller being colourless with a greasy lustre. The table below gives the mean co-ordinate angles obtained from the two figured crystals.

Forms.		Measured.				Calculated.				Error.	
		φ		ρ		φ		ρ		φ	ρ
		°	′	°	′	°	′	°	′	′	′
c	001	—	—	—	—	—	—	—	—	—	—
m	110	51	49	90	1	51	51	90	0	2	1
d	102	89	59	39	22	90	0	39	23	1	1
z	111	51	47	64	24	51	51	64	24	4	0

[9] Proc. Austr. Ass. Adv. Sci., ii., 1890, p. 207.

CERUSSITE.

At the Magnet Mine, Tasmania, cerussite occurs in two different habits, long prismatic or tabular on the *b* (010) pinacoid (Pl. xx., fig. 1), and as flat tables parallel to the basal plane (Pl. xx., fig. 2). In both cases the crystals are twinned on the faces *m* (110) and *m'''* (110) resulting in trillings of pseudo-hexagonal form. A specimen in the Museum collection furnished crystals of the first habit, while Mr. W. F. Petterd obligingly lent some examples of the other. An interesting feature is that the flat pseudo-hexagonal tables of the second habit are invariably contaminated with chromate of lead, doubtless in the form of crocoisite, which imparts to them a canary-yellow colour with occasional patches of red. The occurrence is well described by Mr. Petterd.[10]

"This attractive variety [habit ii.] of a common species is, so far as known, confined to the Magnet Mine, in the upper workings of which it is, although local, fairly abundant. It occurs in fractures and vughs in the gossan zone, but in bunches and sparsely attached as beautiful little crystals, generally in close association with crocoisite, but never so far as observation has gone intermixed with the normal form [of cerussite]; although this is somewhat abundant in its usual adamantine characteristic habit, often showing remarkably perfect development in stellar and cruciform triplet crystals."

Habit i. (Pl. xx., fig. 1.) The two crystals measured were essentially similar, being elongated along the vertical axis and tabular on the *b* (010) pinacoid. The same forms are present in both, namely *c* (001), *a* (100), *b* (010), *m* (110), *r* (130), *i* (021), *x* (102), and *p* (111). In the figure the breadth along the *a* axis is somewhat exaggerated, and the three individuals are drawn in equi-poise, though really only one is well-formed, the other two being quite subordinate. All the forms except *b* are relatively narrow and the prism zone is much striated and interrupted. Of the three individuals forming the trilling, I. is placed in the conventional position, while II. and III. are twinned on the faces (110) and ($\bar{1}10$), respectively, of I. Thus the faces $\underline{m}$ and $\underline{p}$ are coplanar with *m* and *p*, while $\bar{m}$ and $\bar{p}$ are coplanar with *m'''* and *p'''*, and similarly at the other end of the *a* axis of I. but II. and III. have only one coplanar face, namely, the base *c*. The figure is similar to the well-known drawing by Schrauf[11], but the

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[10] Petterd—Rept. Secy. Mines Tas., 1903 (1904), pp. 76-77.

[11] Schrauf—Tschermak's Mineral. Mittheil., 1873, Heft iii., pp. 203-212, Pl. iii., fig. 2.

Magnet mineral has three more forms. The table of angles below gives the measured and calculated values for I. and also the observed angles belonging to forms on II. and III., as, owing to the small size and imperfect development of the crystals, on the goniometer it was impossible to distinguish the reflections belonging to the several individuals, and it was mainly from the angular measurements that the twinning structure was deduced.

Forms.		No. of Faces.	Measured.				Calculated.				Error.	
			φ		ρ		φ		ρ		φ	ρ
			°	′	°	′	°	′	°	′	′	′
c	001	—	—	—	—		—		—	—	—	—
a	100	3	90	0	89	59	90	0	90	0	0	1
b	010	4	0	4	89	56	0	0	90	0	4	4
m	110	6	58	36	89	58	58	37	90	0	1	2
r	130	5	28	39	89	56	28	39	90	0	0	4
i	021	3	0	2	55	22	0	0	55	20	2	2
x	012	2	0	1	19	51	0	0	19	52	1	1
p	111	6	58	39	54	10	58	37	54	14	2	4
$\bar{a}$	100	2	27	23	89	57	27	14	90	0	9	3
b	010	3	62	59	89	56	62	46	90	0	13	4
$\bar{b}$	010	1	62	34	89	59	62	46	90	0	12	1
m	110	2	4	15	89	56	4	9	90	0	6	4
$\bar{m}$	110	1	3	47	90	0	4	9	90	0	22	0
r	130	1	34	5	89	51	34	7	90	0	2	9
$\bar{r}$	130	1	34	23	90	0	34	7	90	0	16	0
i	021	1	62	41	55	17	62	46	55	20	5	3
$\bar{x}$	012	1	62	48	19	50	62	46	19	52	2	2
$\bar{p}$	111	3	4	5	54	8	4	9	54	14	4	6

Habit ii. (Pl. xx. fig. 2). The crystals with this habit differ from the others mainly in having a large basal plane, and in being greatly shortened along the vertical axis, the result being flat tables approaching the hexagonal form. That they are trillings is at once apparent from the reëntrant angles on the edges, and the three systems of striations on the basal plane, which are well seen under the microscope, crossing at angles of approximately 60°, and running parallel to the brachy-axis of each individual. Crystals of a similar habit have already been observed in aragonite, but prismatic crystals seem more common with cerussite. One lot of isolated crystals of a pronounced yellowish colour average 6 mm. in diameter. A few smaller crystals measuring about 1 mm. in diameter, translucent, and of a much paler colour were obtained implanted on the matrix. These latter supplied the best measurements on the goniometer. The most prominent face after the basal plane is the pyramid *o* (112); only one doubtful angle could be referred to the prism *r*, which is accordingly not entered in the figure. The forms recognised are *c* (001), *a* (100), *b* (010), *m* (110), *i* (021), *k* (011), *p* (111), *o* (112). The drawing suggests Laspeyre's figure of aragonite from Oberstein, only our crystal has more forms, and is drawn in ideal symmetry. The measured agree well with the theoretical angles.

Pl. xx., fig. 3 is a stereographic projection showing all the forms recognised on Magnet cerussite and the principal zones.

ZIRCON.

Glen Innes, New South Wales.

Mr. D. A. Porter has been kind enough to lend me for description some crystals of zircon from Glen Innes and Inverell, both in the New England district of New South Wales. In a paper read before the Royal Society of New South Wales, Mr. Porter gives an exhaustive description of the occurrence of zircon in this district.[12] "In the Inverell District zircons are found in many places over a large area, chiefly of basaltic country, forming the watershed of the Macintyre River on the northern side, and extending from N. to E.S.E. from Inverell. They occur principally in the beds of streams, or scattered over low sloping ridges, and in the beds of clay and boulders, which form raised beaches along the creek sides in many of the localities. . . . . The zircons from these several localities mentioned, are usually more or less broken or cleaved, and very much worn and smoothed, but occasionally in fairly perfect crystals, of which figures 1 and 2 are representations." Glen Innes and Inverell are about thirty miles apart and we may take it that the zircon found at both places is similar in origin.

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[12] Porter—Journ. Roy. Soc. N. S. Wales, xxii., 1888 (1889), pp. 82-83, pl. 1., figs. 1, 2.

One good, doubly-terminated crystal from Glen Innes (Pl. xx., fig. 4) was measured on the goniometer. It is slightly worn and broken, and very irregularly developed as is usual with zircon, but the reflections are fairly good. The forms present are *m* (110), *p* (111), *v* (221), *u* (331) and *x* (131), the largest faces belonging to *m*, *p* and *x*; the forms *u* and *v* are small, *u* having only two faces present, while *v* has but one. The crystals vary from clear, colourless to dark red by transmitted light. The measured and calculated angles are tabulated below.

Form.		Measured.				Calculated.				Error.	
		ϕ		ρ		ϕ		ρ		ϕ	ρ
		°	′	°	′	°	′	°	′	′	′
m	110	44	56	90	13	45	0	90	0	4	13
p	111	45	1	42	5	45	0	42	9	1	4
v	221	45	35	60	54	45	0	61	5	35	11
u	331	45	3	69	53	45	0	69	47	3	6
x	131	18	18	63	41	18	26	63	43	8	2

Sp. g. 4·64.

Inverell, New South Wales.

Out of a collection from this locality sent me by Mr. Porter only one crystal was sufficiently good for measurement on the goniometer. It is doubly terminated, most irregular in development, and the faces are polished and slightly rounded, giving only blurred reflections. It shows only the forms *m* (110), *p* (111) and *x* (131), of which *m* is small (Pl. xx., fig. 5). Sp. g. 4·66.

Boat Harbour, near Table Cape, Tasmania.[13]

I am indebted to Mr. W. F. Petterd for some crystals of zircon from the above locality, as well as for notes on their occurrence. They are not found *in situ*, but as waterworn fragments. Mr. Petterd is of opinion that the mineral is a product of contact metamorphism in granite country. The zircon is accompanied by blue sapphires, menaccanite and other detrital minerals. One fairly well developed, doubly terminated crystal was determined (Pl. xx., fig. 6). The forms present are *a* (100), *m* (110), *p*

[13] Petterd—Min. Tasmania, 1893, p. 72.

(111), *v* (221), *u* (331) and *x* (131) of which *a* and *p* predominate. The crystal is dark-red in colour and shows a striated area in one part. All the forms are present with the full complement of faces except *u* which has but two. The crystal measures approximately 10 mm. in diameter. Below are the mean co-ordinate angles obtained. Sp. g. 4·57.

Form.		Measured.				Calculated.				Error.	
		φ		ρ		φ		ρ		φ	ρ
		°	′	°	′	°	′	°	′	′	′
a	100		2	90	1	0	0	90	0	2	1
m	110	45	0	90	2	45	0	90	0	0	2
p	111	44	59	42	9	45	0	42	9	1	0
v	221	44	56	61	5	45	0	61	5	4	0
u	331	45	2	69	43	45	0	69	47	2	4
x	131	18	26	63	43	18	26	63	43	0	0

I wish to express my obligation to Mr. W. F. Petterd and Mr. D. A. Porter for the loan of specimens and for information freely given ; also to Professor T. W. E. David for kindly affording me an opportunity for study in the Geological Department of the University.

NOTE.—While this paper was passing through the press I have learnt that M. A. Lacroix has already described crystals of anglesite from the Mine Meretrice, New Caledonia, in a "Note préliminaire sur les mineraux des mines de la vallée du Diahot (Nouvelle-Calédonie)."[14] The author promises a further description in his *Minéralogie de la France et de ses Colonies*, but I have not been able to refer to the later work.

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[14] Lacroix—Soc. Fr. de Min., xvii., 1894, p. 51.